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Integration of Lean Management, Agile/Scrum, and PMBOK in Improving The UAT Process (A Case Study of Banking Co.)

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Abstract
Digital transformation in the Indonesian banking industry has significantly in-creased pressure on software testing processes. At Banking Co., the number of features under testing rose by 295% between 2022 and 2024, from 5,840 to 43,595 features, while the existing UAT work procedures remained unchanged. This imbalance led to systematic waste, repeated rework, and increased burnout risk, threatening both operational sustainability and human capital. This study aims to identify dominant waste types in the UAT process, formulate an integrated Lean–Agile/Scrum–PMBOK solution, and analyze its potential impact on efficiency and team sustainability. A mixed methods approach was applied through a 65-item Likert survey targeting a population of 371 Testing Analysts, yielding 52 valid responses, and in-depth interviews with three expert informants from different management levels. Waste prioritization was analyzed using the Relative Im-portance Index (RII) and Composite RII. The findings identified seven categories of waste across 12 UAT activities, with Defects (0.756), Movement (0.735), and Waiting (0.725) ranking as the most dominant. The study also revealed a significant perception gap between practitioners and management regarding Movement waste, demonstrating the importance of triangulation in identifying hidden operational problems. Based on these findings, eight improvement op-tions integrating Lean Management, Agile/Scrum, and PMBOK principles were proposed, including Shared Accountability, System Stabilization, WIP Limit, Definition of Ready, and Lean-based UAT procedures. The results indicate that eliminating systemic waste could significantly reduce burnout risk and improve long-term team sustainability.

INTRODUCTION

Amidst global competition driven by rapid technological developments and dynamic customer needs, the ability to innovate consistently is non-negotiable. This shows that companies are forced to respond to competition by adopting agile technologies and working models in order to stay ahead of their competitors (Kraus et al., 2021).

Organizations demand that their digital product development teams be high-ly productive, effective, and efficient (Shah & Ward, 2007; Bakker & Demerouti, 2017). To achieve this goal, the adoption of Agile/Scrum methodologies has become the industry standard, promising superior speed, adaptability, and collaboration (de Borba et al., 2019).

However, in practice, many organizations are caught in a vicious cycle. High productivity pressures, bottlenecked workflows, backlogs, and frequent job changes. Empirical evidence in software development shows that interrup-tions and task switching erode focus and performance and increase cognitive load (Tregubov et al., 2017). If not managed within a healthy work system, it can actually create conditions that lead to burnout. Burnout is characterized by emotional exhaustion, cynicism, and decreased professional effica-cy, which impacts quality and productivity (Tulili et al., 2023). Properly im-plemented Agile actually reduces fatigue through clear roles and responsibilities and a healthy work rhythm, which means that the problem lies in the design of the work system, not the individuals (Venkatesh, Thong, & Chan, 2020).

This is where Lean complements Agile/Scrum. The principles of eliminating waste and respecting people address sources of stress, designing a work procedures that is smoother, more humane, and more stable from start to finish (Ljungblom & Lennerfors, 2021).

The WHO (ICD-11) defines burnout as a syndrome of chronic unmanaged work stress, characterized by: burnout, mental distance/cynicism towards work, and decreased professional efficacy. Burnout is specific in the context of work (World Health Organization: WHO, 2019). In jobs such as software development, interruptions and shifting tasks con-stitute a significant form of cognitive waste (Dybå & Dingsøyr, 2008). The ICSE 2024 study shows that interruptions disrupt the state of focus (flow) and increase cognitive load, thus draining mental energy and lowering the quality of work. These findings confirm that waste not only means lost time, but also leakage of mental energy due to attention fragmentation (Ma et al., 2024).

The occurrence of burnout within development and testing teams is often caused by various inefficiencies in the work system, such as rework result-ing from defects, excessive waiting time, frequent context switching due to high work-in-progress, and superfluous processes that do not provide added value (Venkatesh, Thong, Chan, et al., 2020). These conditions create frustration, anxiety, cognitive fatigue, and the perception that employees spend more time handling administrative bureaucracy rather than producing meaningful outcomes. Therefore, burnout should not merely be viewed as an individual issue, but rather as a logical consequence of a work environment filled with waste and inefficient processes. This perspective aligns with the concept of Lean Management, which emphasizes the elimination of waste to create a healthier and more sustaina-ble working system (Yuonan et al., n.d.; (Cockburn, 2007).

This research was conducted to address the real needs of the industry in developing sustainable, efficient, safe, and value-driven productivity within digital product development teams. The study focuses on integrating Lean Management principles with Agile/Scrum methodologies and PMBOK standards to improve the User Acceptance Testing (UAT) process in a bank-ing company. In this context, burnout experienced by the testing team is not only considered a productivity problem, but also a systemic risk to the sus-tainability of human capital within the organization. Continuous exposure to inefficient work processes may gradually reduce organizational knowledge, employee competencies, and institutional memory. Consequently, improving work procedures through a Lean-based approach becomes an important strategy for maintaining employee capacity and enabling them to contribute effectively in the long term.

The novelty of this research lies in its integrated approach to process improvement and burnout prevention. Unlike previous studies that have examined Lean and Agile separately, this research integrates Lean Management principles (waste elimination, respect for people), Agile/Scrum practices (collaboration, iterative delivery), and PMBOK governance (quality management, risk management, stakeholder engagement) into a unified framework for UAT process improvement. The research specifically contributes to theory by demonstrating the relationship between process waste categories and burnout risk, and to practice by providing actionable improvement options validated through mixed-methods research. The study also introduces the concept of "normalized deviance" in administrative overprocessing, where employees have psychologically accepted excessive administrative burden as an unavoidable part of daily work, highlighting the importance of systematic process review.

The research specifically aims to identify dominant wastes occurring during the testing phase of the Software Development Life Cycle (SDLC), formulate improved work procedures by integrating Lean, Agile/Scrum, and PMBOK principles, and analyze the potential impact of these improvements on project effectiveness and efficiency (Ayyagari et al., 2011). The study is limited to the evalua-tion and enhancement of testing procedures, particularly UAT and SIT processes, within the digital product development environment of Banking Co. Validation is conducted through expert judgment, questionnaires, inter-views, brainstorming sessions, and focus group discussions. The research al-so emphasizes the identification of non-value-added activities and opera-tional fatigue caused by process inefficiencies. Although the findings are in-tended as academic recommendations rather than direct replacements for company procedures, the study is expected to provide valuable insights into how Lean-based improvements can reduce waste, minimize burnout risks, and support sustainable organizational performance.

METHOD

Research Design

This research was conducted to address inefficiency and excessive workload issues within Banking Co.'s operational unit through gradual and sustainable improvements to existing digital product development procedures. Using PMBOK as the main framework, the study integrates Lean Management and Agile/Scrum principles to enhance productivity while maintaining work-life balance (Venkatesh, Thong, & Chan, 2020; Institute, 2017; Serrador & Pinto, 2015). A mixed methods approach combining qualitative techniques, such as interviews and observations, with quantitative surveys and questionnaires was applied to identify waste, analyze burnout causes, and evaluate operational gaps. The research systematically maps work procedures, identifies inefficiencies, develops improvement proposals, and formulates lessons learned with the ultimate goal of creating practical and sustainable solutions that improve efficiency and support long-term productivity.

Data Collection Methods

This research applies a Mixed Methods approach to obtain a comprehensive understanding of operational conditions within Banking Co. Primary data are collected through quantitative and qualitative methods involving the project testing team. Quantitative data are gathered using Likert Scale questionnaires distributed to Testing Analysts in the POL unit to evaluate the existing “As-Is” process, identify waste, assess workload and burnout risks, and measure perceptions toward the proposed Lean–Agile–PMBOK integration (Milanović et al., 2026). Meanwhile, qualitative data are obtained through in-depth interviews exploring employee experiences, operational obstacles, workload issues, stress levels, and recommendations for balancing PMBOK governance with Lean flexibility. In addition, secondary data from company operational procedure documents are utilized to understand the current organizational framework and support the evaluation and development of process improvement proposals.

Data Analysis Methods

The data collected from questionnaires and interviews were analyzed using quantitative and qualitative approaches to comprehensively answer the research questions. Quantitative analysis applied the Relative Importance Index (RII) method to rank dominant waste categories, burnout factors, and priority improvement tools based on Likert scale responses. Higher RII values indicated more critical issues requiring immediate attention. Qualitative analysis was then conducted using Value Stream Mapping (VSM) to identify workflow bottlenecks and excessive waiting times, while the 5 Whys technique was used to determine the root causes of inefficiencies. The findings from both analyses were integrated and validated through Expert Judgment involving senior practitioners and experts at Banking Co. to ensure the feasibility of the proposed Lean Management, Agile/Scrum, and PMBOK integration (Komkowski et al., 2023; (Valamede & Akkari, 2020). The study ultimately produced strategic recommendations to improve testing processes, enhance operational efficiency, reduce waste, support sustainable productivity, and minimize burnout risks within the team.

RESULTS AND DISCUSSION

Prior to presenting the detailed analysis, a summary of the waste identification findings is provided as the empirical foundation for the business solution proposed in the following section. Based on a quantitative survey (n=52 valid responses from a target population of 371 Testing Analysts) and qualitative triangulation with three expert informants, this study identified seven categories of waste across 12 UAT activities mapped to PMBOK Knowledge Areas. Prioritized using the Relative Importance Index (RII), the findings are as follows: Defects ranked highest (RII 0.756), followed by Movement (0.735), Waiting (0.725), Overproduction (0.718), Excess Inventory (0.705), Transport (0.688), and Overprocessing (0.681). The narrow RII range of 0.075 across all seven categories confirms that waste is systemic and requires comprehensive rather than selective intervention. Two methodologically significant findings emerged: (1) a four-position perception gap in Movement waste between practitioner survey rankings (2nd) and expert judgment rankings (6th), detectable only through mixed-methods triangulation; and (2) a case of Normalized Deviance in Overprocessing, which recorded the lowest RII yet received unanimous votes (52 of 52) as the most disruptive waste in open-ended reflection, indicating that administrative burden has been normalized to the point where daily complaints disappear despite persistent cognitive load. These findings directly underpin the eight business solutions formulated in the following section.

The analysis in this section is focused on answering the first research question, namely about what are the dominant types of waste that occur in the digital product development workflow at Banking Co., especially at the application testing stage or User Acceptance Testing (UAT).

This analysis aims to diagnose the current conditions (As-Is), identify gaps (gaps) between practices in the field and the ideal Lean-Agile framework, and validate the root cause of the previously hypothesized problem. In accordance with the research design that has been prepared, the analysis is carried out with a mixed-method approach. This approach combines quantitative data derived from employee perception surveys using the Relative Importance Index (RII) method, with qualitative data obtained from process mapping and in-depth interviews.

All of the findings presented in this section will be a strong evidence based foundation for researchers in formulating business solution proposals that will be described in the next section.

The quantitative survey targeted the full population of 371 Testing Analysts in the POL unit, of whom 52 completed valid responses. The qualitative component involved purposive sampling of three expert informants (MWS, SVN, and IMD) representing distinct management levels a sample size consistent with established mixed-methods research practice, where three to five expert informants are sufficient to achieve triangulation saturation in organizational case studies. Their independent assessments are cross-validated against the survey results throughout this analysis.

A. Existing application testing/UAT work procedures

The initial stage of analysis was carried out by dissecting the work procedures currently carried out by the POL unit in manag-ing digital application testing and then mapping the testing work-flow into PMBOK's Planning Process Group standards to for-mally evaluate project governance.

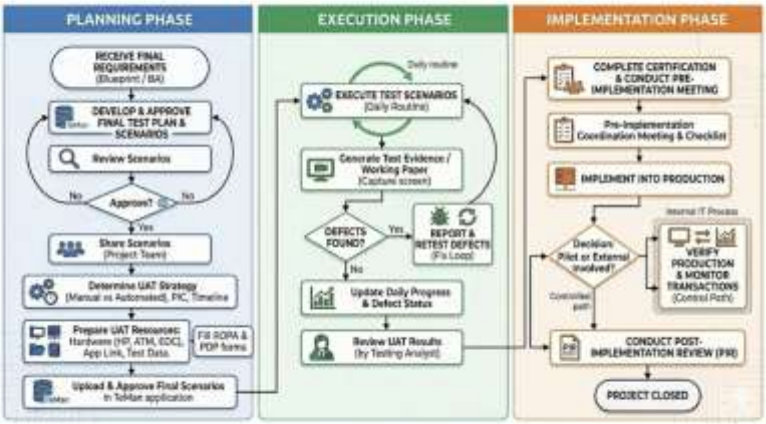

Figure 1. Flow Diagram of the Testing application (UAT) existing work procedures

The following is an explanation of the workflow diagram for application testing:

Table 1. Activities on application testing (UAT) work procedures

No.	Activities	Description
Phase: Planning		
1.	Acceptance & Analysis Requirement	TA receives the final Blueprint document from the BA, studies the existing flow and the changes that occurred, identifies other affected applications, and discusses unclear matters. This activity is the foundation of the entire process, if the requirements are not solid here, the entire scenario that is created next has the potential to be misguided and trigger a massive rework.
2.	Scenario Creation & Approval	TA determines the estimated duration of scenario creation, creates a complete scenario in TeMan or Excel format that can be uploaded to TeMan, then submits the scenario for review and approval by the Reviewer and Group Leader. The resulting scenario must cover the entire scope of requirements without more and without less.
3.	Scenario Sharing & Setting of UAT Strategy	TA shares scenarios with all core Scrum Teams and related teams to agree on scope, get corrections if the scenario is not right, and agree on the UAT timeline and environmental readiness. Once agreed, TA sends an email of the final scenario as proof of agreement, then determines the UAT strategy including the duration, number of resources, target daily scenarios, and the type of testing to be used.

4.	Preparation of Environment, Data & Resource	TA requests the test environment link/URL to the IT team, prepares the required test data, prepares conditioning with the IT team (if necessary for special cases), and submits a tester request if the test requires a Testing Factory. All of these steps should ideally run in parallel but in practice are often sequential because they depend on the IT team's response.
5.	Administrative Planning Input at TeMan	TA creates a new project in TeMan and inputs the plan date into the Myproductivity feature as a productivity record, then uploads the scenario from Excel format into the TeMan system so that it can be executed digitally. These two steps are system registration activities that do not change the content of the scenario or add value to the testing process, but only move the existing information into the set platform.
Phase: Execution		
6.	WP Testing & Documentation Execution	TA runs each scenario on the application according to the DPR and the set daily target, records the results (pass/fail) along with the information in the DPR column, takes screenshots as proof of execution, then organizes and uploads the Working Paper to the TeMan application for a maximum of D+1 after implementation. This is the only activity in the entire UAT flow that directly produces value, which is a verified fact about the quality of the application. Customer data in the screenshot must be masked first before uploading.
7.	Defect Management & ReTest	When the tester finds a defect, the TA informs the IT team via email/Teams and inputs it to TeMan with the OPEN status. After the IT team completes the repair, the TA informs the Tester to retest the previously defective scenario. If the retest results meet the requirements, the status is changed to CLOSED; otherwise, the status changes to RE-OPEN and the cycle repeats from the beginning. All activities in this group are non-value-added, a direct consequence of the quality of development and completeness of the requirements upstream of the process.
8.	Review WP (Working Paper) & Quality Assurance	TA reviews the Working Paper from the Tester every day (maximum D+1) to ensure that the Tester meets the scenario and expectations of the requirements if it is not suitable, the Tester must retest and re-upload. Towards the end of the UAT timeline, the Reviewer conducts a more thorough review of the Taxpayer that has been approved by the TA, followed by the Group Leader. This layered review ensures that all testing evidence is valid and accountable before entering the certification stage.
9.	Daily Reporting, Admin & Regression	During the execution process, TA carries out daily reporting and administration obligations in parallel, including sending UAT progress status emails to all relevant parties, filling in the actual date in Myproductivity TeMan, and implementing regression testing to ensure that defect repairs do not negatively impact other features that have previously worked well.
Phase: Implementation		
10,	Certification, Approval & Release ID	Once the entire scenario passes the test and the WP is approved, the TA compiles the certification document in TeMan as a formal statement that the test has been completed and the results can be accounted for. The certification is then submitted through a four-layer approval chain in succession, before being synchronized with the Release ID of the GSIT team in the Myservice system as a final requirement before implementation can be scheduled.
11.	Preparation, Documentation & Socialization of Implementation	Ahead of the implementation, TA coordinates with all relevant parties to ensure technical and operational readiness including the preparation of implementation checklists, Pilot Memos, and Minutes of Events, as well as the holding of preparatory meetings involving internal and external teams. The results of the agreement in the meeting are then communicated to all participants through an email notification of the implementation schedule and verification scenarios that are sent separately.
12.	Verification, Monitoring & Post Implementation Review	Once the features are successfully implemented into the production environment, TA monitors and verifies real transactions to ensure that the feature functions according to the scenario under actual operational conditions. All test results, findings, and conclusions are then documented in the Post Implementation Review (PIR) report as an official closing document that must be approved by the Group Leader before the project can be declared administratively completed.

The testing/UAT work procedure at Banking Co. consists of 12 structured activities covering planning, execution, and implementation phases, and each activity can be directly mapped to relevant PMBOK Knowledge Areas. This mapping demonstrates that the work procedures have already adopted a comprehensive project management foundation aligned with international standards. Activities such as Acceptance & Analysis Requirement are closely related to Project Scope Management because they ensure that testing requirements and feature scopes are clearly understood before scenarios are created. Scenario Creation & Approval and WP Testing & Documentation Execution are linked to Project Quality Management because they focus on maintaining testing standards, quality assurance, and auditable testing evidence. Other activities, including Scenario Sharing & Setting of UAT Strategy, Preparation of Environment, Data & Resource, Defect Management & ReTest, and Daily Reporting, also reflect PMBOK principles related to stakeholder engagement, resource management, risk management, and communication management. Overall, the work procedure demonstrates a structured upstream-to-downstream testing flow that supports project governance and operational control.

Furthermore, the mapping process reveals that the testing/UAT work procedures are not only administratively complete but also strategically aligned with project management objectives such as quality assurance, risk mitigation, communication effectiveness, and integration control. Activities in the implementation phase, including Certification, Approval & Release ID, Preparation & Socialization of Implementation, and Post Implementation Review, show strong alignment with Project Integration Management and Communications Management. These processes ensure that all testing activities are formally verified, properly communicated, and officially closed according to organizational standards. However, the findings also indicate several operational inefficiencies, including duplicated communication channels, repetitive documentation activities, and synchronization problems between certification schedules and release processes. From both Lean and PMBOK perspectives, these inefficiencies represent opportunities for process simplification and workflow optimization. Therefore, although the existing work procedures already provide a strong governance framework, further improvements are still needed to reduce waste, improve integration between units, and create a more efficient and sustainable UAT process.

However, the field data shows a different reality. A preliminary survey showed that the testing team revealed that 75.7% of respondents experienced a change in needs in the middle of the test-ing process, 89.2% faced technical glitches in the TeMan applica-tion, and 94.6% duplicated inputs manually. The volume of projects handled also increased dramatically from 2,348 projects in 2022 to 3,108 projects in 2024, while the number of features test-ed jumped almost fourfold in the same period. These facts show that the completeness of procedures does not in itself guarantee the efficiency of implementation in the field.

Root cause analysis using the 5 Whys method found that this gap stems from one fundamental condition: The current work procedures are designed to ensure the administrative completeness of each stage but are not equipped with proactive mechanisms to identify and eliminate waste in the first place. A well-documented procedure is not necessarily an efficient procedure and that is the gap this study seeks to bridge.

Based on these gaps, the following section presents a systematic identification of waste in each of the 12 activities using the Seven Types of Waste framework. This analysis aims to concretely map where waste occurs, in what form, and how its accumulation im-pacts the overall efficiency of the testing process in Banking Co.

B. Waste Identification based on PMBOK Knowledge Area

In this section, the analysis focuses on identifying the manifestations of seven main categories of waste that have been validated through trian-gulation of empirical evidence from question-naire results, document analysis, and in-depth interviews with ex-perts. Each of these wastes is then mapped directly into the most affected PMBOK Knowledge Area in the UAT Work Procedure. This mapping aims to show specifically the location of procedural weaknesses in the current UAT Work Procedure which is consid-ered more administrative than proactive in terms of data so that structured and systemic improvement recommendations can be formulated.

Based on the questionnaire survey and expert judgment validation, this study identified seven categories of waste in the UAT manual testing process, namely Defects, Movement, Waiting, Overproduction, Excess Inventory, Transport, and Overprocessing. Among these categories, Defects emerged as the most critical waste with the highest Relative Importance Index (RII) value of 0.756, while Overprocessing had the lowest value of 0.681. However, the narrow gap between these values indicates that all categories of waste are significantly present and must be addressed systematically. The findings reveal that waste in the UAT process is not only caused by testing activities themselves, but also by unstable requirements, scope changes, weak synchronization between scenarios and systems, and feature releases that are not fully ready for testing. Expert judgment further confirmed that many defects arise from immature requirements, insufficient SIT processes, inconsistent coordination among stakeholders, and inadequate upstream readiness within the SDLC process.

The study also highlights the strong interconnection among different categories of waste within the testing workflow. Movement occurs when Testing Analysts are required to handle multiple parallel projects, resulting in loss of focus, cognitive fatigue, and reduced accuracy. Waiting waste appears due to delays in approvals, requirement clarification, defect fixing, tool instability, and slow responses from related parties. In addition, Overproduction and Excess Inventory emerge when too many projects are processed simultaneously without clear workload limitations or project prioritization. Transport waste is caused by duplicated information flows across multiple platforms such as TeMan, Excel, email, chat, and dashboards, while Overprocessing occurs because of repetitive administrative activities, lengthy manual inputs, and excessive documentation requirements that do not directly improve testing quality. A particularly significant methodological finding is the phenomenon of Normalized Deviance observed in Overprocessing. Although Overprocessing statistically recorded the lowest RII value (0.681), it received unanimous votes from all 52 respondents in the open-ended reflection question (Q66) as the most operationally disruptive waste category. This paradox arises because respondents have psychologically accepted administrative overburden as an unavoidable part of daily work—a state in which repeated exposure to a known problem erodes the perception that the problem is abnormal or addressable. The disappearance of daily complaints does not indicate the absence of harm, but rather its normalization. This finding structurally justifies why administrative simplification (Improvement Options 2 and 3) must be treated as a top strategic priority despite the relatively low Likert-based urgency score.

From the perspectives of Lean Management, Agile/Scrum, and PMBOK, the findings demonstrate the urgent need for integrated process improvement within the UAT environment. Lean Management emphasizes reducing non-value-added activities without eliminating essential quality assurance and compliance processes. Agile/Scrum highlights the importance of stronger collaboration among Product Owners, Business Analysts, IT teams, and Testing Analysts through clearer priorities, Definition of Ready (DoR), WIP limits, and faster escalation mechanisms. Meanwhile, PMBOK analysis shows that each category of waste is closely related to specific project management knowledge areas, including Quality Management, Resource Management, Schedule Management, Communications Management, Scope Management, and Integration Management. Overall, this study successfully identifies the primary sources of waste in UAT manual testing and demonstrates that integrating Lean, Agile/Scrum, and PMBOK principles can support more efficient processes, better testing quality, improved implementation timelines, and more sustainable team workloads.

C. Analysis of Expert Perceptions of Lean Management Implementa-tion

After the waste in the testing/UAT work procedure is identified and mapped into the PMBOK Knowledge Areas, the next stage is to analyze the expert judgment's perception regarding the relevance, priorities, and challenges of implementing Lean Management in the testing/UAT work procedure. This analysis is important because it is not enough to read waste identification as quantitative findings, but also needs to be validat-ed through a managerial perspective to ensure that the findings are in ac-cordance with actual conditions in the field.

This analysis uses data from two main sources, namely the results of a questionnaire survey from Testing Analyst respondents and the results of in-depth interviews with three expert judgments, namely MWS, SVN, and IMD. Questionnaire data was analyzed using the Relative Importance Index (RII) method to quantitatively determine waste priorities and im-provement options. Meanwhile, the results of the expert judgment inter-views were used to validate the results of the RII, explain the root of the problem, enrich the context, and identify implementation challenges from the aspects of people, process, technology, and governance.

The findings from the interviews and questionnaire analysis show that Lean Management is considered highly relevant for improving the UAT process without replacing the existing Agile/Scrum framework. Although each expert had a different perspective regarding Lean implementation, all agreed that Lean should function as a complementary approach to strengthen operational efficiency, collaboration, and governance. The current UAT process has already adopted Agile/Scrum principles, but several challenges remain, including unstable requirements, weak project prioritization, and limited coordination among stakeholders. The experts emphasized that process improvement should focus on simplifying workflows, reducing waste, and maintaining quality assurance rather than eliminating essential testing activities. Using the Relative Importance Index (RII), the study identified several priority improvement options, including Shared Accountability BA–IT–Testing, TeMan Stabilization & Integrated UAT Platform, simplification of UI/UX and administration, WIP limits, and Definition of Ready (DoR). These findings indicate that improving the UAT process requires not only faster testing execution, but also stronger governance, integrated systems, clearer accountability, and better workload management across teams.

The study also reveals that implementing Lean Management within the UAT environment faces significant organizational, cultural, and operational challenges. One major issue is the mismatch between formal testing/UAT work procedures and real implementation practices in the field, which often creates administrative difficulties and inconsistency between units. Human factors and work culture were identified as the most difficult barriers, particularly the mindset that treats inefficiency and excessive administrative activities as normal daily routines. In addition, the testing team remains heavily dependent on upstream parties such as Business Analysts and IT teams, causing delays, compressed testing schedules, and excessive overtime when earlier phases are not completed on time. Technical instability within the TeMan system and sudden IT framework changes further reduce workflow efficiency and disrupt automation initiatives. Overall, the findings demonstrate that successful UAT transformation requires strong integration between Lean Management, Agile/Scrum collaboration, and PMBOK governance principles, supported by active involvement from all stakeholders including BA, IT, management, and testing teams.

D. Synthesis and Gap Analysis

This section synthesizes the findings of the waste identification analysis and the expert judgment perception analysis by comparing the actual conditions of the current UAT process (As-Is) with ideal conditions based on the principles of Lean Management (To-Be). The gaps identified in each dimension are the direct basis for the improvement options proposed in the next section.

Table 2. Synthesis of As-Is and To-Be Conditions Based on Lean Management Principles

No.	Dimensions	As-Is (Current Conditions)	To-Be (Ideal Lean Conditions)	Key Gaps	Improvement Options (Tabel IV-4)
1	Requirement Readiness	Requirements often change in the middle of the UAT process without a formal approval mechanism. Minimum requirement standards prior to submission of the blueprint do not exist. 78,8% of cases revise their scenario because of changes late in the process, whereas 84,6% have to perform their analysis process from scratch because of the changed requirements (Q6). The testing team bears the rework of failures that should have been prevented upstream.	Each Blueprint meets the Definition of Ready before being submitted to the testing team. Changes in requirements are assessed through a Change Impact Assessment with the approval of the product owner. The testing team has formal authority to return projects that have not met the criteria.	There is no Definition of Ready; no freezing point requirement; There is no formal authority for the testing team to reject projects that are not yet ready.	Definition of Ready + Buffer Time + Testing Escalation Authority (Priority 5 / RII 0,879)
2	Workload Capacity and Distribution	Testing Analyst works on multiple projects in parallel with no formal boundaries. There is no mechanism to reject new projects when they are at full	Capacity is managed through a project complexity-based matrix. The limit on the number of projects is implemented and reviewed through an	There is no capacity limit policy; there is no formal mechanism for rejection of new projects;	WIP Limit and Capacity Management of the Testing Team (Priority 4 / RII 0,881)

		capacity. 69.2% reported schedule conflicts. Focus disruption (Movement) is at the 2nd priority of RII but is not recognized as an urgent problem by management.	already running weekly forum. Project priorities are communicated and explicitly agreed upon by all parties.	Focus disorders are not detected as a priority from the management level.	
3	Information Systems and Integration	UAT data is scattered across TeMan applications, Excel, email, and group messages. 75.0% of the scenario information that is already in TeMan is still resent via email. 94.6% confirmed duplicate manual inputs. The system's technical glitches result in the highest priority votes of the entire waste category.	One integrated platform becomes a single source of truth. Standardized UAT Master files are automatically uploaded into the system without the need for re-input elsewhere. The system's performance supports the ever-increasing volume of projects.	There is no single source of data; no automatic integration mechanism; The technical glitch of the system has not been fundamentally resolved.	Integrated UAT System and Platform Stabilization including UAT Master File (Tabel IV-4, Priority 2 / RII 0,912)
4	Standardization of Work Procedures	The testing/UAT work procedure was only actively read by 19.2% of the team as a daily work guide. 59.6% work based on individual habits that differ between teams. No party was tasked with monitoring the relevance of the procedures as the project volume nearly quadrupled.	The testing/UAT work procedure serves as a guide based adaptive minimum standard that sets clear boundaries without rigidly regulating each step. One party is designated as the owner of the process who proactively and periodically reviews its relevance.	The procedure is generally designed but hardly used; no process owner is responsible for periodic updates; The way it works depends on the individual's habits.	testing/UAT work procedure Lean Edition - Adaptive Minimum Standard (Priority 6 / RII 0,829)
5	Accountability and Quality Governance	The burden of quality accountability is borne disproportionately by the Testing team. Delays or incompleteness from BA and IT do not face equivalent formal consequences. 92,3% of respondents stated this was the most urgent need for improvement in the entire survey.	Performance indicators for quality, timeliness, and defect rates are proportionally divided across BA, IT, and TA. No single unit bears the entire cost of failure from the other party. The escalation path between units is formalized with a binding response deadline.	There are no cross-unit performance indicators; asymmetry of accountability is not formally addressed; There is no escalation path with an agreed time limit.	Joint Accountability of BA–IT–TA (Priority 1 / RII 0,919)
6	Continuous Improvement	The weekly retrospective forum is already running but the output is not connected to the management's decisions. There are	Each retrospective session produces one concise document that management must respond to within the stipulated time. Kaizen becomes a collective	Retrospective outputs are not connected to management; there is no deadline for responses to	Structured Kaizen Feedback Channels and Retrospective Output Improvements (Priority 7 / based Expert Judgment)

	many direct messages from many TAs related to input/complaints to the TeMan application to the system management team, but not all proposals/obstacles get consistent and timely follow-up. Many Testing Analystsslowly stopped voicing this because there was no systematic response.	output of the team with protected time rather than individual targets added on top of an already full workload.	inputs submitted; Kaizen is required as an individual target which is contrary to Lean principles.

The six dimensions above together show that the current testing/UAT work procedures already exist and are well documented but are not yet equipped with mechanisms that encourage all parties to work efficiently, take responsibility together, and continue to improve themselves. Each ideal condition outlined is not just a Dream, but a tangible change that can be made gradually through eight improvement options that have been validated by the team, leadership, and survey data. This is the basis for formulating solutions to improve testing/UAT work procedures in the next section.

Implementation Plan and Justification

After formulating a proposal to improve the UAT Work Instruction (IK) procedure that integrates the principles of Lean Management, Ag-ile/Scrum, and PMBOK governance, the next crucial step is to develop an implementation plan that is realistic, adaptive, and measurable. This section specifically addresses the third research question (RQ3), namely: "What is the potential impact of the implementation of Lean-Agile-PMBOK integration on time efficiency, test quality, and teamwork sustainability in Banking Co.?"

To address these challenges, this section will present the implementation roadmap, projections of positive operational impacts, and change man-agement strategies needed to ensure the successful adoption of these new procedures in harmony by all stakeholders across units (BA, IT, and Test-ing). This action plan is designed to be executed in stages, starting from a pilot project in selected testing units to a full-scale implementation that is equipped with transparent justification of benefits in each phase to break the cycle of systemic burnout without triggering waste due to overwork (Muri).

A. Phased Implementation Plan (5W+1H)

The implementation of changes to operational procedures and work philosophy in the UAT testing process at Banking Co. requires a highly structured approach so that it can be effectively adopted by the entire organizational ecosystem, involving cross-unit synergy between BA, IT, and management. Therefore, this action plan is designed using the 5W+1H (What, Who, When, Where, Why, How) framework to ensure that every dimension of the operational transition process is clearly defined, transparent, and accountable on the ground.

This phased implementation plan approach is applied to schedule the execution of 8 improvement options in stages. This is crucial to ensure that process improvement activities (Kaizen) do not trigger new excess workloads (Muri) for personnel but systematically break the chain of burnout loops and transform testing/UAT work procedure from just administrative documents to dynamic work guides.

Table 3. Testing/UAT work procedure Phased Implementation Plan (5W+1H)

No.	Improvement Option	Why (Waste + RII)	Who	When (Phase + Duration)	Where	Composite RII	How (Technical Mechanism of Change)
1	Shared Accountability BA–IT–Testing	Defects 0.756 \nWaiting 0.725 \n92.3% (Q59, mean 4.60)	Decision: Senior VP \nExecution Director: Head BA + Head IT + Head Testing	Phase 1 \n(1–3 months)	Cross-divisions BA, IT, Testing	0.919	1. The declaration of the principle of mutual accountability is signed by the management. \n2. Compile proportional KPIs per unit with the leadership coalition. \n3. Formalize the escalation path between units with a response deadline. \n4. Starting from the declaration of principles, proceed to the formal KPI system in 3 months.
2	TeMan Stabilization & Integrated UAT Platform	Transport 0.688 \nOverprocessing 0.681 \n90.4% (Q54, mean 4.60)	Head IT + Senior Testing member (IT technical team as implementer)	Phase 2 \n(3–6 months)	Test management system + entire UAT team	0.912	1. Improve server performance and system architecture (1–2 months). \n2. Design the UAT Master File with senior Testing member. \n3. Standardize templates. \n4. Build auto-upload. \n5. Pilot 1 team. \n6. Roll-out to the entire team. \nPrerequisite: Option 6 is completed before the Master File template is designed.
3	Simplification of UI/UX and TeMan Administration	Overprocessing 0.681 \nTransport 0.688 \n86.5% (Q56, mean 4.42)	Head IT + Senior Testing member (TA Representat	Phase 1 (imminent): UI/UX \nPhase 2 (2–3 months)	Test management system	0.885	Component 1 (imminent): establish a two-track approval policy of scenarios with no technology costs.

			ive as an examiner)				\nComponent 2 (Phase 2): audit the system navigation flow with TA representatives → identify steps that can be trimmed → redesign the interface to minimize steps per routine operation, eliminating those identified as non-value-adding.
4	WIP Limit and Testing Team Capacity Management	Movement 0.735 \nExcess Inventory 0.705 \n92.3% (Q52, mean 4.40)	Senior Testing member (Forum per month as a mechanism)	Phase 1 \n(3–5 business days)	Testing Team	0.881	1. Arrange a capacity matrix: simple projects 3–5 per TA, complex 5–6 TA per project (IMD framework). \n2. Set it as GL policy. \n3. Integrate it into the Forum per month as a routine agenda. \n4. Start with the spreadsheet, migrate to the system once Option improvement 2 is complete.
5	Definition of Ready (DoR) + Buffer Time + Escalation Testing Authority	Defects 0.756 \nOverproduction 0.718 \n90.4% (Q51, mean 4.44)	Head Testing + PO + Senior BA (TA as the executing authority)	Phase 1 \n(3–5 business days)	BA → TA handover point	0.879	1. Compile a DoR checklist with BA and PO. \n2. Set it as an official policy. \n3. Socialize that return = official procedure, not rejection. \n4. Record all returns in the system as BA KPI data.
6	Testing/UAT Work Procedure Lean Edition [Adaptive Minimum Standard]	Defects 0.756 \nOverprocessing 0.681 \n82.7% (Q57, mean 4.17)	Senior Testing member as a PIC (Senior TA representative as a contributor)	Phase 1 \n(1–2 weeks for drafting & trial, then 1–3 months for formal legalization)	All Testing/UAT work procedure activities	0.829	1. Testing/UAT work procedure audit, identify 3 types of improvements (Add/Remove/Align). \n2. Compile standard templates and rubrics with TA representatives. \n3. Set as a

							mandatory standard with the signature of management. \n4. Evaluation of the relevance of each quarter led by senior. \n5. Update A5 and C1 activities after Option 2 is completed.
7	Structured Kaizen Feedback Channel	All 7 waste via feedback loop \n84.6% (Q64, mean 4.27)	Senior Testing member (facilitator) \nHead Testing (output recipient) \nSenior Manager (respondent)	Phase 1 \nStarting today (zero fees)	Weekly evaluation forum + system (direct messaging feature)	EJ-Based	1. Change the format of the evaluation output: 1 concise document per session (condition improved + problematic + 1 decision request). \n2. Senior testing member is mandatory for a written response within 3 working days. \n3. Responses are read at the beginning of the next session. \n4. Protected Time of one hour/week is set as a team's right, it cannot be substituted for project assignments.
8	AI/Selective Automation for Recurring Scenarios and Activities	Transport 0.688 \nOverprocessing 0.681 \n(Q53, Q56 indirect support)	Head IT + Head Testing Team	Phase 3 \n(6–12 months)	Blueprint → Scenario information flow	Expert Judgement Based	Non-negotiable prerequisites: \n(1) Option 6 is completed, \n(2) Master Files are standardized (Option 2), \n(3) IT's commitment that object IDs do not change without coordination. \nOnce the prerequisites are met: select 1 project type → pilot → evaluation → phased roll-out for the project type that has

		proven to be successful.

B. Impact Projection and Benefit Analyst

This section projects the potential strategic and operational impacts of the implementation plan of the eight im-provement options that have been formulated. Before presenting further analysis, it is important to emphasize that all figures, percentage declines, and success indicators presented in this section are forward-looking estimates in the pre-implementation research corridor. Therefore, the actual impacts that occur on the ground require periodic objec-tive validation through recommended post-implementation studies running within a span of 6 to 12 months after the policy is adopted. The formulation of this projection is solidly built using an empirical database of the results of quantitative surveys of daily implementers, triangulation of expert judgment commitments, and several practical benchmark data in the digital banking industry.

1. Operational Efficiency Projections (Process & Technology)

Efficiencies in the upstream process and needs management pillars are projected to grow significantly through the integration of Improvement option- 1 (Shared Accountability BA–IT–Testing) and Improvement op-tion- 5 (Definition of Ready (DoR) + Buffer Time + Escalation Testing Authority). Current operational data records massive waste where 78.8% of respondents stated that the test scenario had to be revised due to changes in requirements in the middle of the road (Q10, mean 4.17 was one of the highest scores in the survey). This condition is exacerbated by the finding that 84.6% of needs change frequently after the official analy-sis begins (Q6, mean 4.06) and 76.9% of UAT windows narrowed due to delays in submission from the BA or IT side (Q46, mean 4.04). By enact-ing the Definition of Ready (DoR) as a strict quality control gate support-ed by 90,4% of respondents for the minimum readiness standard before the Blueprint is submitted (Q51, RII 0,888) as well as cross-unit shared responsibility KPIs rated as the most urgent need by 92,3% of respond-ents (Q59, mean 4.60), the burden of quality accountability will be pro-portionately distributed. These systemic interventions have the potential to cut the frequency of unplanned changes in upstream needs. The impact of direct causality, the intensity of revision of repetitive scenarios can be significantly reduced, the waiting time for defect repairs from the IT team that has been complained about without time certainty by 67.3% of respondents (Q24, mean 3.77) can be cut, and the capacity of the testing team can be completely diverted to actual testing activities that really add value (value-added testing). Because Defects was identified as the first priority waste in this study (RII 0,756) and the root of the problem lies at this upstream coordination point, the integration of Option 1 and Option 5 has the greatest projected efficiency impact on the overall UAT ecosys-tem.

2. System Transformation and Administrative Efficiency Projections (Process & Technology)

In the dimensions of system transformation and technological efficiency, the alignment of Improvement option- 2 (TeMan Stabilization & Integrated UAT Platform), Improvement option- 3 (Simplification of UI/UX and TeMan Administration), and Improvement option- 8 (AI/Selective Automation for Recurring Scenarios and Activities) is deployed as the main driving force to eliminate waste overprocessing. The preliminary survey confirmed the existence of bureaucratic anomalies in the form of 94.6% of manual duplication of data inputs every day, including the phenomenon where 75.0% of respondents had to resend scenarios via redun-dant emails even though the data was already available in the system (Q12, mean 4.00). Referring to the benchmark presented by MWS regard-ing the success of the integrated platform at BCA Digital which is able to cut daily coordination meetings to less than one hour, the development of the UAT Master File based on auto-upload and performance stabilization of the TeMan system which is considered very urgent by 90,4% of respondents (Q54, mean 4.60) has the potential to eliminate the majority of the dual manual input activities. This administrative time saving is strengthened by redesigning the UI/UX to minimize unnecessary steps per routine operation, directly addressing the complaints of 73.1% of respondents who consider the current scenario upload process to be disproportionately time consuming (Q16, mean 4.13), as well as eroding the habit of manual progress reporting via email which is still carried out by 34.6% of respondents (Q32, mean 2,87) as well as filling in actual date data which is considered by 46.2% of respondents not to contribute to quality (Q33, 3:19).

3. Simplification of administrative flows

The step to simplify the system administration flow is supported by 86.5% of respondents (Q56, RII 0,885) and will be formally accommodated through Option 6 (Testing/UAT work procedure Lean Edition Standard Minimum Adaptive). The goal is to boost the utility of the ac-tive work guide from the current critical figure of only 19.2% (Q1, the lowest mean of 2,46 out of 65 survey items, although 57.7% rated the document as actually quite clear in Q2. The revitalization of this procdure is supported by 82,7% of respondents (Q57, RII 0,835) and is projected to be able to reduce the waste of rework due to different reviewer standards currently experienced by 51,9% of respondents (Q30, mean 3,40). Once the foundation of this work procedure is stable and standard-ized using standard scenario templates (supported by 78.8% in Q53, RII 0,823), the application of artificial intelligence (AI) technology is selec-tively projected to be able to automate the flow of information from Blueprint to draft scenarios for iterative project types. This staging strat-egy is crucial to mitigate the risk of technical failures due to unilateral framework changes from IT teams without cross-unit coordination, as IMD critically revealed in an in-depth interview that previous automation scripts became unusable due to the lack of upstream-downstream align-ment.

4. Projection of Team Well-being and Realistic Boundaries

Furthermore, the structuring of human capacity governance and the protection of cognitive focus is accommodated through Improvement option- 4 (WIP Limit and Testing Team Capacity Management) and Improvement option- 7 (Structured Kaizen Feedback Channel). Currently, the Testing Analyst work ecosystem is plagued by wasteful systemic Movement/Context Switching waste that is not visible to management. This is evidenced by the perception gap of 4 positions between the results of the daily implementation survey which places Movement in 2nd place (RII 0,735) and the expert judgment assessment which places it in 6th place. As a result of indefinite parallel project as-signments, 69.2% of personnel reported severe schedule clashes (Q50, mean 3,85), resulting in 51,9% of respondents being forced to lose 15 to 30 minutes of produc-tive time to reimmersion time each time they switched tasks between projects in one working day (Q44, mean 3,37). The implementation of a WIP Limit policy and the granting of formal rights to reject projects at full capacity which 63,5% of re-spondents currently do not have (Q47, mean 3,71) have the potential to restore the accumulated lost focus time into produc-tive working hours that are invaluable to TA each week. This operational clarity is strengthened by the institutionalization of a structured kaizen feedback channel that requires a maximum management response within 3 working days to meet the expectations of 84.6% of respondents who need active leadership support (Q64, mean 4.27), while cutting the frag-mentation of verification reporting information which is currently still scattered across several unofficial channels at once without a single official point according to 32,7% of respond-ents (Q39, mean 2,81). Alt-hough the direct messaging feature in the test management system is al-ready available as confirmed by IMD, the commitment of response dead-lines from management remains a decisive instrument so that any im-provement proposal from the field does not evaporate without a real resolution, so that a culture of continuous improvement (Kaizen) can grow participatory. Financially, allocating 1 hour/week for Protected Time is a strategic 2,5% investment of a standard 40-hour work week. By consolidating unstructured, ad-hoc complaints into a single focused session, it avoids daily disruptions and offers management a highly realistic thresh-old to approve for minimizing compounding rework hours caused by Defects (RII 0,756).

As a final conclusion, the systemic implementation of all these solution options leads to improving the well-being aspect of teamwork. Empirical data from the im-pact survey showed very strong optimism, with 76.9% of respondents believing that eliminating systemic waste would significantly reduce the risk of burnout (mean 4.04), a critical condition that was also validated through confirmation from SVN regarding the urgency of handling the workload of the implementation team. With the erosion of upstream wastes (such as rework, administrative duplication, and cog-nitive focus disorders), personnel's cognitive energy can be recovered and redirected to high-quality, value added testing work. However, in line with the critical analysis of SVN and IMD senior speakers, this Lean-Agile-PMBOK integration solution honestly does not promise the total elimination of overtime up to 0%. This is due to the inherent nature of the banking industry's operational policies that abslutely require activities outside of regular working hours, such as the process of launching the system (deployment) at night or releasing features on weekends to main-tain the stability of customer service. Lean-based improvement in the context of Banking Co. specifically focuses on cutting the overtime com-ponent caused by co-ordination failures, rework, and avoidable overtime, rather than eliminating technical overtime that is indeed a core opera-tional characteristic of the banking industry it-self.

Beyond numerical productivity, mitigating Muri and systemic waste stra-tegically restores Banking Co.’s core values. It rebuilds eroded 'Teamwork' and re-enables the true 'Continuous Pursuit of Excellence' without sacrificing team well-being.

C. Expert Validation and Change Management Strategy

The success of Lean Management integration in Banking Co. depends not only on the quality of the technical solution, but on how humanely the changes are implemented. The transformation forced on teams that are al-ready overburdened will only create new waste (Muri). Therefore, this section maps out a realistic change management strategy, starting with policy improvements instead of technology investments.

Given that teams are under high capacity pressure, change management strategies are not radically implemented, but rather simplified into three pillars of humanistic and gradual execution:

1. Pillar-1: Policy and Structural Urgency (People & Urgency)

The initial step was focused on the objective recognition of operational risks by Management using empirical data, where 84.6% of the team val-idated that the current overtime routine was not sustainable (Q63). There is a need for a complexity-based capacity matrix policy (Improvement option 4) and removing individual Kaizen targets that trigger mental fa-tigue (Muri).

2. Pillar-2: Process Optimization

Certify testing/UAT work procedure Lean Edition as a flexible work guide (Improvement option 6) and then implement a Definition of Ready (DoR) checklist upstream to filter out unready documents to stop waste defects (Improvement option 5).

3. Pillar-3: System Integration and Continuous Automation (System & Technology)

Once the procedural foundation on the second pillar is repeatedly stable, the improvement momentum is consolidated into technology investments gradually to eliminate waste. This step includes the development of an auto-upload UAT Master File on the TeMan application (Improvement option 2) to cut 94.6% of the duplication of daily manual data inputs. Once the data format is integrated and stable, Artificial Intelligence (AI) technology is selectively applied in Phase 3 to automate the creation of draft scenarios from the DoR-compliant Blueprint (Improvement option 8).

CONCLUSION

This research concludes that the biggest sources of waste in the UAT process at Banking Co. are Defects and Movement, which are mainly caused by unprepared business requirements, IT system issues, and inadequate management policies (Cortes et al., 2016). To address these problems, the study integrates Lean Management, Agile/Scrum, and PMBOK principles through improvements in UAT work procedures to en-hance efficiency, testing quality, and reduce burnout risks among team members. The recommendations include prioritizing policy and procedural improvements before automation implementation, conducting regular evaluations of work procedures, protecting team capacity, and increasing management involvement to support sustainable productivity and employee well-being. Furthermore, future studies are recommended to measure the actual impact of implementation and compare the application of this approach across different organizations and project types (Maslach & Leiter, 2016; Dikert et al., 2016).

REFERENCES

Ayyagari, R., Grover, V., & Purvis, R. (2011). Technostress: Technological Antecedents and Implications. *MIS Quarterly*, *35*(4).

Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*(3), 273–285. https://doi.org/10.1037/ocp0000056

Cockburn, Alistair. (2007). *Agile software development : the cooperative game*. Addison-Wesley.

Cortes, H., Daaboul, J., Le Duigou, J., & Eynard, B. (2016). Strategic Lean Management: Integration of operational Performance Indicators for strategic Lean management. *IFAC-PapersOnLine*, *49*(12), 65–70. https://doi.org/10.1016/j.ifacol.2016.07.551

de Borba, J. C. R., Trabasso, L. G., & Pessôa, M. V. (2019). Agile Management in Product Development. *Research Technology Management*, *62*(5), 63–67. https://doi.org/10.1080/08956308.2019.1638488

Dikert, K., Paasivaara, M., & Lassenius, C. (2016). Challenges and Success Factors for Large-Scale Agile Transformations. *Journal of Systems and Software*, *119*, 87–108. https://doi.org/10.1016/j.jss.2016.06.013

Dybå, T., & Dingsøyr, T. (2008). Empirical studies of agile software development: A systematic review. *Information and Software Technology*, *50*(9–10), 833–859. https://doi.org/10.1016/j.infsof.2008.01.006

Institute, P. M. (2017). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*. Project Management Institute.

Komkowski, T., Antony, J., Garza-Reyes, J. A., Tortorella, G. L., & Pongboonchai-Empl, T. (2023). The integration of Industry 4.0 and Lean Management: a systematic review and constituting elements perspective. *Total Quality Management and Business Excellence*, *34*(7–8), 1052–1069. https://doi.org/10.1080/14783363.2022.2141107

Kraus, S., Jones, P., & Kailer, N. (2021). Digital Transformation: An Overview of the Current State of the Art of Research. *SAGE Open*, *11*(3). https://doi.org/10.1177/21582440211047576

Ljungblom, M., & Lennerfors, T. T. (2021). The Lean Principle Respect for People as Respect for Craftsmanship. *International Journal of Lean Six Sigma*, *12*(6), 1209–1230. https://doi.org/10.1108/IJLSS-06-2020-0085

Maslach, C., & Leiter, M. P. (2016). Understanding the Burnout Experience: Recent Research and Its Implications for Psychiatry. *World Psychiatry*, *15*(2), 103–111. https://doi.org/10.1002/wps.20311

Milanović, I., Tomašević, I., Stojanović, D., Simeunović, B., & Slović, D. (2026). Integration of business process management and lean management: from literature review to framework proposal. *International Journal of Lean Six Sigma*, 1–39. https://doi.org/10.1108/IJLSS-07-2025-0202

Serrador, P., & Pinto, J. K. (2015). Does Agile Work? A Quantitative Analysis of Agile Project Success. *International Journal of Project Management*, *33*(5), 1040–1051. https://doi.org/10.1016/j.ijproman.2015.01.006

Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management*, *25*(4), 785–805. https://doi.org/10.1016/j.jom.2007.01.019

Tulili, T. R., Capiluppi, A., & Rastogi, A. (2023). Burnout in Software Engineering: A Systematic Mapping Study. *Information and Software Technology*, *155*. https://doi.org/10.1016/j.infsof.2022.107116

Valamede, L. S., & Akkari, A. C. S. (2020). Lean 4.0: A new holistic approach for the integration of lean manufacturing tools and digital technologies. *International Journal of Mathematical, Engineering and Management Sciences*, *5*(5), 854–868. https://doi.org/10.33889/IJMEMS.2020.5.5.066

Venkatesh, V., Thong, J. Y. L., & Chan, F. K. Y. (2020). How Agile Software Development Methods Reduce Work Exhaustion. *Information Systems Journal*, *30*(4), 733–761. https://doi.org/10.1111/isj.12282

Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., Hoehle, H., & Spohrer, K. (2020). How agile software development methods reduce work exhaustion: Insights on role perceptions and organizational skills. *Information Systems Journal*, *30*(4), 733–761. https://doi.org/10.1111/isj.12282

Yuonan, J., Mamedov, R., Borg, E., & Vigerland, L. (n.d.). *Agile Project Management in Banking-A study of how agile methods are modified to suit the context of a bank*.